

AMERICAN VETERINARY REVIEW,

NOVEMBER, 1880.

ORIGINAL ARTICLES.

PROSPERO.

MALIGNANT TUMOR OF THE FACE AND NASAL CAVITIES—DEATH
BY STARVATION AND REPEATED SECONDARY HEMORRHAGES. *

BY A. LIAUTARD, M.D., V.S.

Mr. President and Gentlemen :

The specimen I have to show you this evening is one of malignant tumor of the face and nasal cavities, obtained from a very valuable animal, of great reputation on the trotting turf, and which may be known to you by the reports which appeared at different times in the newspapers. It is the head of the trotting horse Prospero, which I condemned as incurable in May last, and which was allowed to die from starvation through mistaken kindness of his owner, imposed upon by ignorance and charlatanism.

The history of the case is, in a few words, as follows: Some

* Paper read before the New York Pathological Society.

time in April, this animal was stabling in Philadelphia, and was noticed to have a little swelling on the right side of the face. This increased by degrees and was accompanied by offensive discharge from the nose. Shown to a veterinary dentist—for that specialty claims to exist in veterinary medicine—he examined the mouth, said that he found a decayed tooth, extracted it, and though the tooth proved healthy, said, “it was all right, and the patient would get well.”

Still, he did not get well, the swelling kept on increasing, the discharge became more abundant and offensive, and a veterinarian called to see him and made a diagnosis of suppurative collection of the sinuses, and advised trephining. This was done. The tumor then was quite large, soft at places and the opening through the maxillary bone was done with a simple scalpel, showing how diseased it already was. This operation was no more successful, and I was requested by the owner to see his horse. The doubt, I thought, was not possible. The animal had a cancerous degeneration of the bones of the face—sarcomatous, I believe—and I advised him to be destroyed.

At the time when he was about being killed, a veterinarian of some celebrity in Philadelphia, and another pretended horse dentist celebrity of New York, who were present, declared the action of destroying a disgrace, as the horse was suffering with decayed teeth only and would recover if those were removed.

This permission was granted and the 4th, 5th, and 6th molars were extracted. All you can see are healthy, with the exception of a small decayed spot on one.

The horse did not improve for that. Still, at last, and for reasons that I cannot understand, he was returned to his owner, with the information that everything that humanity could do was done, and that nature would do the rest.

Again, however, our horse dentist, who had written through the newspapers of his success in the case, finding his patient not recovering fast enough, calls another veterinarian, this time from Brooklyn, professor in one of the veterinary colleges of New York, and once again the horse is submitted to surgical interference. He is trephined in the upper part of the nasal bone, through

the turbinated bone and then sent to the country, to his birth-place, to complete his recovery, which was at times reported as making fast progress.

The animal died on the 22d of September, and the post-mortem proved that death had taken place by starvation, complicated by repeated secondary hemorrhage from the palatine artery of the right side.

The following are the notes taken from the autopsy made 24 hours after death :

The animal lay in the field where he had been turned out, on the left side. His body is fearfully emaciated, bones protruding, muscles atrophied, nothing in fact but skin and bones is left of the still good looking horse seen but a few weeks before. His abdomen round the flank is much retracted and measured scarcely three feet in diameter. The skin removed exposed all the muscular structure pale, flabby and free from any fat. The abdomen open, shows the intestines retracted to almost nothing, the stomach contains a bolus of green food about the size of two fists, the small intestine is entirely empty, contracted in almost its whole extent, and in places reduced to a very small size, about one inch in diameter, the large colon contains a certain quantity of food, grass seeds and earth mixed together, perhaps six pounds in weight, the cœcum has a little watery food in it, the small colon is empty, the mucous membrane of these organs is pale and shrunk all over.

The spleen and kidneys are healthy, the liver also, though somewhat softened by the post-mortem. The lungs are generally healthy, a little emphysematous in the anterior lobe. The pericardium is filled with serosity. The heart is pale, flabby, with post-mortem clots in both ventricles; large blood vessels almost empty all through the body; ganglions of the abdomen and chest infiltrated.

After severing the head from the neck at the occipito-atloid joint, the skin, before being removed, presented on it the marks of the openings where it had been trephined, neither of which were cicatrized.

On removing the skin, the tumor presented the same aspect

as it does now, irregular in shape, soft at places, hard at others, and giving in some parts the sensation of a collection of pus underneath. The cavities of the alveolæ are all filled with new growths, somewhat hardened, showing on their lower surface the marks of the lower molar teeth. The second cavity, from which a healthy tooth had recently been extracted, was filled with partly masticated food; the palate bone is diseased in its whole extent and the mucous membrane of the regions on the opposite side is separated from the teeth by an accumulation of pus extending more or less into the alveolæ on that side. Sections being made through the head a little on one side of the median line, show the septum nasi healthy, and this being taken off allows a full view of the nasal cavities.

On the right side, in the meatuses, in the cavities of the turbinated bones, in the sinuses, you will observe several malignant growths of various sizes extending back into the fauces and closing them, thus interfering with respiration during life. A similar condition, though less marked, is also found on the left side.

The diagnosis of cancerous disease was then made too evident, and it remained for the microscope to establish the true nature of the malignant process of that specimen.

Dr. Peabody, to whom I referred that investigation, kindly consented to examine various pieces taken from the alveolar cavities and from the tissue forming the growth on the outside of the face; and came to the conclusion that it was not a case of osteo sarcomatous degeneration, as I thought, but one of carcinomatous development,—a fact after all which can scarcely convict me of error, both diseased processes being malignant in their characters, and which certainly does not in any way alter my prognosis of the case.

What is generally known in veterinary science as osteo sarcoma I have met four times, and I doubt if any veterinarian would not have made the same diagnosis, unless microscopic examination was made; a lesson which I have received in this case, and that I will not forget. I hope other veterinarians will profit by it also, and investigate into the microscopical nature of similar tumors before arriving at a final conclusion.

COMPARATIVE HELMINTHOLOGY.

CISTICERCUS TENUICOLLIS IN AN ADDAX ANTELOPE AND A MOOSE.

BY THE SAME.

About seven months ago an addax antelope was found dead at the menagerie of the Central Park. She had been sick for a few days with diarrhœa, loss of appetite, &c., but her disease had not been diagnosticated, and Mr. Conklin, the Superintendent, sent her to the American Veterinary College for post-mortem. A careful examination failed to demonstrate any cause of sickness except in the abdominal cavity. On the opening of this part of the body the great mesentery, which was spread over the whole intestinal mass, was found covered with a large number of little bladders, varying in size from that of a small pea to that of a lady's apple—some pedunculated, others closely adherent to the peritoneum. They contained, visible to the naked eye, little white bodies adherent in many places to the walls of the cyst. In removing the omentum and exposing the intestines, these were found also covered with similar cysts—some collected several together, others single, and a large number of these were found loose, floating in the peritoneal fluid. All the organs were found healthy except the liver, which presented on its surface a few cysts, imbedded in the thickness of the capsule of Glisson. A diagnosis was made accordingly.

On the 28th of Aug. I received word from Mr. Conklin to call at the menagerie and look at a moose which had been sick for three or four days. Her appetite had been failing by degrees, she had lost considerably in flesh, and was suffering from severe diarrhœa also. When I made my visit about an hour afterwards, I found the animal had died but a few minutes before.

Our arrangements were made to have her at once brought to the American Veterinary College, where post-mortem was made immediately.

The only lesions which she presented were entirely similar to those found in the antelope. Same arrangements of the cysts, also in large numbers; some loose and others adherent, here a few small ones, there a number attached together, as in grapes. The liver presented also a number of them, and were in general aspect entirely similar to those of the former case. The cause of death was made as due to the presence of the *cysticercus tenuicollis*.

Some of them were sent to Dr. Birdsall, Professor of Helminthology, to the College, and the following is the answer made to our inquiries as to the true nature of the parasites:—

MY DEAR DOCTOR:

The two specimens which you sent to me for examination I will designate as No. 1 and No. 2. No. 1 proved to be one hydrated cyst (*echinococcus*; and they are now all referable to *Tœnia echinococcus* as their mature form; to specify zoological varieties is no longer necessary). It was of the multilocular variety, presenting the exogenous and the endogenous forms of growth. The cyst which you sent was about the size of a hen's egg, irregular in outline, with protuberances upon it (exogeneous masses); and one section was seen to be filled with a slightly gelatinous fluid, and great numbers of smaller sacs, from the size of a mustard seed to that of one which filled one-half the large cyst. Most of these were collapsed and detached, at their place of attachment calcareous masses being found. Thus, these cysts were well advanced in degeneration. The walls between some of these cysts consisted of firm connection-tissue, so that an alveolar appearance was presented. Taking a small cyst: on account of its transparency I found by microscopic examination a number of *echinococcus* heads on the inner surface. They were usually detached, and presented a granular appearance. The circle of hooks could still be made out, but the exact number was difficult to obtain; twenty-eight could be counted with certainty, arranged in two rows alternating with each other and leaving both of nearly the same length. The average width of the circle of hooks is 0.4 m. m., occupying about one-third of the diameter of the head. The average length of the hooks is 0.192 m. m.

I present a sketch of one of these heads as seen from above (No. 1, a), another as seen from the side (No. 1, b); in both of which the circlet of hooks can be seen, and also a view of detached hooks as they lie in different positions (No. 1, c).

As the number of heads in a small cyst not larger than a pea was often five or six, and as the number of cysts in the single mass which you sent was over fifty, the whole number of heads in this portion above must be many hundred.

Specimen No. 2 consisted of several cysts of variable size, attached to a common preclicle, and formed of connective tissue. Imperfect staining (on account of the specimen not being fresh) with silver nitrate, showed the existence of lymphatics, and a rather doubtful appearance of an endothelial layer. On opening one of these cysts carefully, it was found to enclose another cyst whose contained fluid distended both. This latter one was free, and terminated in a neck, capped by a white head bearing the proportion shown in drawing No. 2, a. The thin membrane which composed the sac was not fresh enough to yield satisfactory results with silver nitrate. The fluid within the sac was of a dark brown color; it contained albumen in a small amount and considerable amorphous material; some imperfect crystalline forms, the nature of which I am ignorant of; also mycelium of a form of fungus.

The head was inverted, like the finger of a glove doubled partly outside in, which gave an external transverse fissure that could be penetrated by a fine needle. The head was filled with calcarious granules; as proved by the solution of carbonic dioxide on the addition of acetic acid. I must confess that I was unable to perceive a circlet of hooks, though the characteristic transverse rugæ in the neck was very distinct, and the whole appearance shows conclusively that we have to do with a cysticercus.

I am disposed to refer it to the cysticercus tenuicollis, on account of the variable and large size of the cysts, some of which were as large as a hen's egg; also on account of the manner of growth and attachment resembling somewhat an echinococcus cyst, for which they have often been mistaken, as was long ago pointed out by Küchenmeister. The form and appearance of the

head and neck favors this view, also its attachment to the mesentery. It is, besides, a wide-spread form among the lower animals.

Yours respectfully,

W. R. BIRDSALL.

The death of the two valuable animals, likely to be followed by that of others of the same family, which are kept in close proximity to the ground where these were placed, induced me to inquire as to the cause of the presence of the parasites and of the source whence they came. Suspecting that the tape worms which they give rise to, might be the cause of it, and that these tenias being deposited in the food, grass or water these ruminants partook off, I suggested the propriety of examining the rats which crawl about those places, and to see if in those I could not find the starting cause of the trouble. After waiting a few days a rat killed on those grounds was brought to me. Mr. A. McKenzie, student at the College, made a careful post-mortem examination of its whole intestinal canal, and the result was the discovery of a large number of tape worms, the true nature of which however, Dr. Birdsall is inclined to consider as of a different origin than the cysticercus tennicollis. Further investigations remain to be made, and if the two parasites can be connected, the remedy is plain of itself; get rid of the rats and the ruminants will escape the fearful death which threatens them. But unfortunately the advice is much easier to give than the application is to follow.

AZOTURIA, OR POISON

BY TINCTURE OF CANTHARIDIS.—DEATH BY LACERATION OF THE BLADDER WITH A BLUNT INSTRUMENT.

BY C. H. PEABODY, D.V.S.

(Read before the United States Veterinary Medical Association.)

Mr. President and Gentlemen of the Association:

The case I am about to describe to you was of much interest to me, and I hope it may elicit some remarks as to the treatment

I pursued, and some discussion as to the correctness of my diagnosis.

On July 25, 1879, I was requested by Mr. Ritchmond, of Pawtucket, to see his mare. On my way to the stable I got the following history:

"The mare is dark brown, seven years old, weighs ten hundred and fifty, stands sixteen hands high. During the last year, about once a month, she has had what I called inflammation of the kidneys. The last attack occurred three weeks ago. A fortnight ago she had what I thought to be lung fever. I treated her and thought she was doing well, but last Tuesday the mare lay down and I cannot get her up. First," said he, "I gave aconite and belladonna, but afterward I gave \mathfrak{z} vi. of sweet spts. of nitre, every day for three days. Then, thinking she required a stimulant, I gave \mathfrak{z} iii. of the tincture of cantharides in a pint of water, for four days in succession."

At the stable I found the mare on her off side, moving her fore feet to and fro, but she had neither sensation or motion in the posterior extremities. The pulse was 96; respiration, 60; temperature, 107; the visible mucous membranes were dark brown. There was no swelling of the extremities, or of any part of the head or body, and percussion and auscultation of the chest did not indicate any trouble there that I could find, as she lay. On examination I found the rectum filled with hard and dry fæces, and passing the catheter I drew about three gallons of thick, bloody and sour-smelling urine. Diagnosis: poisoned by cantharides. Prognosis: doubtful.

TREATMENT.—I prescribed oleum lini one pint, soda bicarbonate \mathfrak{z} iv., in solution every three hours, until \mathfrak{z} iv. should be given, linseed gruel to drink, and ordered the mare to be turned over during the night. July 26. Pulse, 80; respiration, 60; temperature, 106; the membranes are dark brown; I emptied the bladder of about two gallons of urine, lighter in color than the day before, and less sour in smell; the rectum was full of dry fæces; very little sensation over lumbar region. With slings I got the mare up and had the extremities well rubbed; she then tried in vain to micturate, and to overcome the straining, I introduced into the vagina a

suppository of solid extract of belladonna 3 ii. The straining stopped in about three quarters of an hour. I then gave oleum lini 3 iv., and the solution of soda every eight hours. The mare was fed with grass and cooked oats.

July 27th.—Pulse, 60; respiration, 48; temperature, 104. The general appearance of the animal is much improved; the urine quite light in color and not so thick; the fæces are soft. I discontinued the soda and gave alcoholic stimulants.

July 28th.—Pulse, 48; respiration, 36; temperature, 102 1-5. The visible mucous membranes are of a lighter color. She stands without slings. Same treatment.

July 29th.—Pulse, 48; respiration, 36; temperature, 101 3-5. The mare passes about a pint of urine, light in color, every two hours; fæces nearly normal.

July 31st, received telegram mare worse. I found her with a pulse of 72; respiration, 50; temperature, 105 2-5. Contrary to direction, the mare had been fed hay and raw oats, and had received some medicine from her owner. She was straining, and voiding bloody and turbid urine. The fæces were very dry and hard, and covered with a bloody slime. There seemed to be a general loss of strength, and in my perplexity I tried the effect of spirits turpentine 3 i. every three hours in oil 3 iv., with another suppository, and left the mare, expecting to make a post-mortem on the morrow.

August 1.—Pulse, 60; respiration, 40; temperature, 103. The straining gradually diminished after my departure and was succeeded by a profuse perspiration, which dried off about midnight. At 2 A. M. the mare drank half a bucket of gruel, and in the morning ate a few boiled oats. The urine is quite thick and streaked with a yellow pus; the fæcis are hard and covered with a yellow slime. I prescribed fluid ext. ergot 3 iv every six hours with a stimulant boll. ammo. carb, 3 ii, gum camph. 3 i, pulv. barb. alœs 3 i, pulv. gentin 3 i, one every eight hours.

August 2.—Pulse stronger, 50; respiration, 32; temperature, 102; urine quite clear; fæces soft. The body of the mare feels greasy; over each eye and external angles of the ilium abscesses are formed from which two to four ounces of foetid pus escaped when opened.

August 3.—Pulse, 40; temperature, 101 3-5; respiration, 20. The mare appears better; alcoholic stimulants resumed.

August 5.—Pulse, 40; respiration, 30; temperature, 100 2-5. The urine and fæces about normal. A slough has taken place over the iliums, to which sulphur and alum has been applied. The hair over the body is peeling off, leaving a smooth black surface.

August 15.—Pulse, 36; respiration, 18; temperature, 100. She feeds well and takes an hour's exercise every day; very fine hair is beginning to appear over the body.

September 1—Mare turned to pasture.

October 1—She was put to work; the hairs of the mane and tail have come out. The body is covered with a light brown hair.

This, gentlemen, is the end of the case which it was my purpose at the outset to present. But, in conclusion, I will abridge from my note-book the fate of the mare. On the evening of December 5th, the owner, in attempting to pass a catheter, lost it, and at two o'clock of the following morning, December 6th, I was called to visit the mare and, if possible, recover the instrument. On examination, I found the bladder punctured in two places. The animal was at once destroyed. In the post-mortem made at three A. M., by the uncertain light of a lantern, I found the mesentery and colon ruptured and a rectal tube nineteen inches in length which had been used for a catheter, lying at the posterior face of the diaphragm. My purpose, now, gentlemen, in thus minutely describing the history of this case and treatment, has been to receive and not to impart knowledge. I have once more come as a scholar from my village to this metropolis. Was this a case of azoturia, associated with influenza or some form of lung trouble? or, was it inflammation of the kidneys and spasms of the neck of the bladder induced by large doses of cantharidis? or, did it arise from long continued and improper administration of medicines?

EDITORIAL.

EPIZOOTIC INFLUENZA AND ITS SEQUELÆ.

Another outbreak of epizootic influenza has made its appearance in different parts of the United States, and for the last few weeks has created more or less excitement amongst owners of horses. Like that of 1872, it covered quite a large extent of territory, and since its appearance in Boston, where it was first reported in the last part of September, has traveled southward to New York, and we are informed has spread to New Jersey and then to the Western States, and at last accounts was raging in Nova Scotia. Similar to the outbreak of eight years ago, though it appeared later in the season, it followed a period of hot and dry weather and exhibited itself by the usual external manifestations of catarrh of the anterior air passages, laryngitis, cough, nasal discharge, &c. Not so extensive as the first, it nevertheless will, we believe, be accompanied with more fatal cases, and has presented also more varied forms of complication. For instance: in Boston abdominal sequelæ, we understand, have been quite common, and though this was also met now and then in New York, still in this last city, a more fatal disease has followed and carried with it a large number of horses, a state of things which can be easily understood from the fact that the people, not realizing the weakening influence the disease had on the animals, these were kept at work though entirely unfit for it. Purpura hemorrhagica has been and is now prevailing in New York City to an alarming extent, especially so, if it should develop itself amongst the numerous valuable trotting horses which are owned in this great metropolis. An idea of the mortality resulting from this sequelæ can be obtained by the imperfect statistics gathered by some of the students of the American Veterinary College made from inquiries at the rendering dock in this City. At several visits made to that establishment, where the number of dead horses were received, the following figures were obtained:

For the 24 hours ending Oct. 18th, 7 A. M., out of 54 cadavers, 40 presented the external lesions of purpura.

For same period ending Oct. 19, out of 36 cadavers, 17

"	"	20,	"	16	"	8
"	"	22,	"	37	"	18
"	"	23,	"	15	"	7
"	"	25,	"	26	"	14

a total of 104 out of 184 dead animals, or an average of 56½ per cent.

Showing, as this no doubt does, the severity of this disease, it would be very interesting to have similar statistics obtained in other cities and to have them recorded. They would go far in proving to our horse owners that though the disease as it appeared first was not a necessarily fatal affection, it nevertheless rendered the animal unable to perform any kind of work, and by its debilitating influence make him predisposed to contract other forms of disease as long as the blood remained loaded with the poisonous element which accompanied these species of afflictions.

VETERINARY COLLEGE OPENINGS.

Like medical schools, veterinary colleges have resumed their work, and once more for several months the halls of the different institutions will be filled by students who are desirous to obtain a medical or veterinary education. Medical schools have no reason to complain of the attendance on their lectures, for the number of students can be counted by hundreds and some of them have scarcely room enough for the new applicants. Veterinary colleges are not as yet in the same flourishing condition. But the time is certainly coming very fast when the buildings our veterinary faculties occupy will be found too small and their accommodations deficient. This applies specially to the American Veterinary College, which reopened its course of the first of October, before a large audience, who had come to hear the introductory lecture, which was delivered by Prof. J. L. Robertson. Some changes have been made in the faculty of the college, and while some great losses

have been sustained, the appointment of new professors and lecturers, men of known ability in their specialties, will well fill the places of those who, by unavoidable circumstances, have separated from the institution; and, if we can judge by the attendance present, the officers of the college will have no reason to be dissatisfied by the success of the season of 1880-81.

HUMAN AND ANIMAL VARIOLÆ: A STUDY IN COMPARATIVE PATHOLOGY.

BY GEORGE FLEMING, F.R.C.V.S., ARMY VETERINARY INSPECTOR.

(From the *Veterinary Journal*, London, England.)

(Continued from p. 292).

I have alluded to the experiments carried on in Italy from 1871 to 1874, with a view to decide the question as to the value of animal and humanized vaccine. On referring to the report,* I find the Commission was composed of a President and five members of the medical profession, one of whom was Professor Bassi, a very distinguished teacher in the Turin Royal Veterinary School, and a Secretary. Permission was given to make use of the cattle on the royal farm at Turin; and the children in the Foundling Hospital, as well as the soldiers of the garrison, were made available in these experiments. Sixty-one cattle—chiefly cow-calves and heifers—were utilized, and the inoculations were made by puncture and incision, chiefly on the udder, seldom on the labia of the vagina. One side was, in most cases, inoculated with animal, the other with humanized lymph. This lymph was either that of natural cow-pox, artificial cow-pox (transmitted from cow to cow), humanized vaccine transferred to the cow; lymph transferred from arm to arm; or horse-pox, from a natural outbreak of the disease in horses.

* *Esperienze Comparative sul Vaccino Animale e sull'Umanizzato. Relazione Commissione, etc. Torino, 1874.*

It is very important to note that two experiments were made to test the transmissibility of human syphilis to calves. At the seat of inoculation there was formation of pustules, induration of the udder and the lymphatic glands, which continued for about a month; but otherwise the animals remained in good health.

The conclusions arrived at by the Commission were as follows:

1. The results of inoculation by puncture and incision are the same, though in the thicker skin of adult man or bovines incision is preferable; for children puncture is not so painful, and takes less time. Incision alarms the mother, as it causes a little bleeding.

2. The time of year has no marked influence on the success of vaccination or re-vaccination, though temperature will hasten or retard the appearance of the eruption.

3. The form of pustulation is in man and animals essentially the same, except that in cattle there is less lymph, and the umbilicated appearance of the pustule is not so distinct.

4. The lymph from different sources has not the same potency. In horse-pox, 72.9 per cent. of the inoculations were successful; in natural cow-pox, 72.8; and in artificial cow-pox, 44.19.

5. Humanized lymph has double the potency of that from animals.

6. Humanized lymph conveyed to cattle diminishes in activity.

7. Natural cow-pox lymph inoculated on mankind increases in potency.

8. Comparison of the primary lymph with that of re-vaccination is greatly in favor of the former.

9. *Human small-pox cannot be transmitted to cattle.*

10. The syphilis virus can be implanted in bovines, and successfully re-transferred to man.

11. Humanized lymph possesses more tenacity of activity than any other; with properly preserved crusts or dry lymph, animals can be inoculated successfully.

12. Lymph is more easily procured from man than from animals.

13. The microscope gives no indication of the activity of lymph.

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. Relazione

From what I have now stated, I think there are few who will continue to maintain that human variola and cow-pox are one and the same disease—*i. e.*, cow-pox being merely small-pox transferred to the cow; or that there is any relationship or resemblance between them, except in so far that they are eruptive, run a certain course, generally attack the organism only once in a lifetime, and are antagonistic to each other. It would be strange, indeed, if the virus of small-pox could be so changed that, by being passed only once through the system of the cow, it should completely lose its identity and never regain it, no matter how long it might afterwards be cultivated in its native soil; and that, while before it could only be successfully transferred with the utmost difficulty to bovine animals, and perished in two or three removes, it should be capable, after its transmutation, of not only preserving its new characters of peculiar localized eruption and non-infectiousness, but also retain all its potency after endless transmissions through human, bovine, equine, and perhaps other animal species. "The poor unfortunate cow" is certainly not the victim of human variola, as was asserted with more sentiment than accuracy at the conference, by a speaker who, nevertheless, confessed he had not succeeded in his attempts to produce vaccinia from small-pox.

Taking up this position, and supporting it by ample evidence, the knowledge we possess of virulent diseases in general, as well as the fact that the most extensive, careful, and exhaustive experiments by the ablest pathologists have failed in transmuting variola into vaccinia,* I may be asked how we are to account for the

* Mr. Ceely himself affords us almost conclusive evidence as to non-identity between human variola and vaccinia, in the extreme difficulty, according to his own showing, with which the former could be transferred to bovines, and the remarkable facility with which the latter was propagated by the milkers. He says that in December, 1838, on a large dairy farm where there were three milking sheds, vaccinia first appeared in the home or lower shed. The cows in this shed being troublesome, the milker from the upper shed, *after milking his own cows*, came to assist in this for several days, morning and evening, when in about a week some of his own cows began to exhibit the disease. It appears that, having chapped hands, he neglected washing them for three or four days at a time, and thus seemed to convey the disease from one shed to another. During the progress of the disease through this shed, one of the affected cows, which had been assailed by its fellows, was removed to the middle shed, where all

success of two or three persons in this direction many years ago. We may, if we choose, refer to the Lyons Commissioner's experiments and explanation for a reply, and conclude that the small-pox transferred to the cow remained small-pox still, though it was so modified in virulency, when re-transferred to man, as to produce at first only a local eruption, though in some instances small-pox in a mild form followed. If I mistake not, more than one instance is on record, in which medical men have imitated Ceely and Badcock, and re-inoculating children from the cow, have produced nothing but small-pox. Among other instances of this kind, I may refer to that of Martin (*Boston Medical Journal*, 1860). That practitioner inoculated the udder of a cow with small-pox matter, and thought he had produced cow-pox. Collecting what he believed to be vaccine lymph from the vesicles, he vaccinated about fifty children with it, but produced only a serious outbreak of small-pox, from which several died. And a similar, but more alarming occurrence took place in India. Even in one of Ceely's reported successful cases of vaccinia produced by variolation, we are informed that his assistant, in opening the supposed vaccine vesicle due to the small-pox virus, accidentally punctured his hand with the lancet, charged with moist lymph. On the fourth day there was a hard, deep-red, papular elevation at the seat of puncture. This was followed by constitutional disturbance—as "headache and other febrile symptoms, with roseola and fiery red papulæ on the face and other parts." On the sixth day the constitutional symptoms were more intense, and the papulæ on the face, neck, trunk, and limbs exhibited ash-colored summits on the seventh day, and the febrile symptoms were abated; on the eighth day, the papulæ were more yellow, and some were desiccating, but headache was still present.

But if it is admitted that if it was really cow-pox Ceely and

the animals were perfectly well. This cow, being in an advanced stage of the disease, and of course difficult to milk, was milked first in order by the juvenile milker, for three or four days only, when, becoming unmanageable by him, its former milker was called in to attend exclusively to it. In less than a week all the animals in this shed showed symptoms of the disease, though in a much milder degree than it had appeared in the other sheds, fewer manipulations having been performed by an infected hand.

Badcock contrived to transfer to children, might it not be suggested that in all probability the animals from which they transferred it were accidentally infected with the natural malady at the time they were inoculated with the small-pox virus?

Cow-pox was far more rare in those days, and many might be inclined to conclude, that if the animals supposed to have developed vaccinia from small-pox were not inoculated with small-pox lymph by mistake, they were already infected with cow-pox, from which children were subsequently vaccinated. Ceely himself admits (*Transactions of the Provincial Medical and Surgical Association*, vol. viii. p. 378) that cow-pox was prevalent in the locality when his experiments were undertaken, and he also states that in the only two instances in which he succeeded in producing vaccinia by variolation, *the animals were also vaccinated quite close to the inoculation punctures*; while with a third heifer experimented on at the same time, *but which was not vaccinated*, there was no result.

It is somewhat extraordinary that, considering the grave issues at stake, Mr. Ceely has not been prevailed upon to undertake further experiments, and to repeat that success which could not be achieved by any subsequent experimenters, though they had the advantage of far more abundant means and facilities. Surely if, as has been asserted, cow-pox could be so easily produced accidentally, by contact with small-pox-infected people at the commencement of this century (though there is no proof of this), it should be as readily developed now, experimentally or accidentally; and especially when we find that vaccination—which some authorities say is only variolation—is easily and certainly practiced in the bovine species. According to his own statement, Mr. Ceely only succeeded twice, under the conditions mentioned above, in producing vaccinia from small-pox, though his experiments appear to have been numerous. All subsequent attempts of most careful, skilled, and patient investigators have failed.

But if the views I entertain are well-founded—and reasoning and facts are altogether in their favor—vaccinia cannot be developed from human variola; the two are distinct and special infections—as distinct as two individuals of the same species. Vaccinia

is as much a disease of the bovine species as small-pox is a malady peculiar to man—each is a special form of variola, and exists and prevails not only independently, but marked with all its own particular characteristics and attributes. Both attack males and females, in direct proportion as these are exposed to contagion.

The symptoms of small-pox in mankind are well-known. Not those of vaccinia, however, though Ceely has described what he designates the “natural disease” very clearly.* If we study the symptomatology in a large number of cases artificially produced by inoculation with humanized vaccine lymph—no matter in what region of the ox the virus has been deposited, we shall find a remarkable constancy and regularity.

After the second or third day there is seen in a white-skinned animal at the seat of puncture, a small red papule which, on the third or fourth day, is somewhat large and prominent, rather pale, surrounded by a bright-red areola, and slightly depressed in the centre. From the fourth to the fifth day, the papule, now a vesicle, has a well-defined umbilicus, a marked areola, and an elevated margin. These characters are all the more developed towards the eighth or ninth day, when they begin to subside; the pustule becomes brownish-color in the centre, and yellowish or necrotic towards the margin. Desiccation has begun; the brown tint gradually invades the entire surface; the areola disappears; the prominence of the pustule is diminished; and towards the twelfth or fourteenth day nothing usually remains except the crust, which

* It must be remembered that at that time very little was known of animal diseases, or of the history of those wide-spreading destructive epizootics which have only been carefully studied within the last few years. We need not be surprised, therefore, to find grave mistakes committed with regard to bovine diseases, up to quite recent times, nor need we wonder at Mr. Ceely speaking of malignant vaccine, and even variola appearing in cattle. In the same volume in which his observations appear, is a report on vaccination, drawn up by a medical committee; and the superstructure of the report is based upon the supposition that the cattle-plague which had repeatedly visited this country, raged on the Continent, and was seen in India, was only variola—*variola vaccinica*—which, transferred to mankind, conferred immunity from small-pox! The same blunder was made in 1865, when cattle-plague was destroying our herds, and vaccination was resorted to, to stay its ravages.

falls about the fifteenth to the twentieth day, leaving only a slight, but permanent cicatrix.

The same changes occur in a dark skin, but they cannot all be so readily perceived, in consequence of the pigmentation.

The size and prominence of the pustules may, of course, vary, and their base appear more inflamed in some cases than other, according to constitution, condition of the animal, and other circumstances: the evolution being generally most notable in those which are in good health. The virus seems to be most active towards the sixth or seventh day after inoculation, and then rapidly loses its potency. Indeed, it has been found that though there is then not so much lymph as afterwards, between the third and seventh days is the period when it is most potent.

As a rule, there is little or no general disturbance of health perceptible; and though in the natural disease a more or less generalized eruption has been observed in rare instances, yet it has not been noticed in the artificially induced malady; while it has not been at all unusual to discover a kind of secondary eruption, of exactly the same character, around the inoculation points—an eruption which might be due to accidental inoculation when the operation was performed. In the experiments of the Lyons Commission, a young bull, successfully inoculated in three places on the scrotum, on the sixth day had a newly-developed pustule behind one of the places. This had all the characters of the others, and though its presence was attributed to auto-inoculation, yet there was no certainty that it was so produced.

The natural cow-pox I have described in my work on "Veterinary Sanitary Science and Police" (vol. ii., p. 91). The symptoms and course of the disease may be briefly described as follows: After slight febrile disturbance, partial loss of appetite and suspension of rumination, trifling constipation and diminution of the urinary secretion—symptoms which may, nevertheless, be absent or unperceived—and lessened quantity, as well as altered quality of the milk (more aqueous and disposed to coagulate than usual), the udder is observed to be swollen, particularly near the teats, and is painful during milking. In two or three days there are seen on the udder, and chiefly on the teats, small hard tumors, varying

in size from that of a pea to a haricot-bean, and of a pale-red hue. Increasing in volume, a viscid yellow fluid appears beneath the epidermis. At first this fluid is in the centre, but it soon extends towards the circumference, giving the nodosities or papules a light-blue tint in the middle, but a reddish-blue or yellow color towards the periphery. At this period the centre is also usually umbilicated or depressed; the margin is hard, tumefied, and painful; and when the skin is thin and transparent, a red areola is noticed. These "pocks" gradually increase in dimensions, and towards the eighth or tenth day have acquired their maximum development. On the udder they are generally circular; on the teats they are oblong. The contents then become purulent in character, and a crust begins to form in the centre, gradually extending to the circumference. This crust is thick, shining, and deep brown or black in color; it is firmly fixed to the skin, from which it does not become detached until the tenth to the fifteenth day, unless accidentally removed. When it has fallen off, it leaves a cicatrix, which persists for a considerable time, and is at first bluish-red in color, but gradually becomes pale. On the udder the cicatrix is depressed in the centre.

In the same animal there may be successive crops of papules and pustules; they may not all be developed simultaneously, some being crusted, while others are only nodes. The latter eruptions may, however, be due to re-inoculation during milking; this is favored by the existence of sores or fissures on the teats. In consequence of this circumstance, the malady may not pass through all its phases within a less period than a month or six weeks. The lymph taken towards the eighth or tenth day is most active for vaccination purposes.

The variable color of the vaccinal pustules is not an essential characteristic of the disease, and does not therefore indicate the real nature of the eruption. If the skin is fine and white, the variolæ have a silvery-white, bluish-white, or slatey hue; if it is thin but dark colored, they are leaden-grey; if the hair is of a bright shade, they have a color varying from a bright-red to a pale or blood-red tint, but always wear a metallic lustre. On a thick, white, and wrinkled skin they have a dull opaline lustre.

In exceptional cases there is somewhat severe constitutional disturbance before the eruption appears. For instance, in the Wurtemberg Veterinary Reports for 1877, mention is made of a cow which showed a rather high degree of fever: hot skin, quickened respiration, horripilation, and rigors from time to time. On the four teats appeared more than a score of pocks; these contained a very small quantity of thick lymph, some of which was preserved in capillary tubes, and another portion removed by means of a fine hair-pencil and kept in glycerine. These portions were successfully employed in vaccination. The owner of the cow was accidentally inoculated through milking the animal, a large pock forming on his hand.

In studying cow-pox, it must not be forgotten that there is a spurious vaccinia, sometimes designated *vaccinella* or *vaccinoides*, a disease, or several forms of disease resembling cow-pox to some extent, but yet differing from it in several important features. It is generally observed soon after calving, and would seem to be contagious, as it attacks nearly all the cattle in a shed when one cow becomes affected. It appears to be very uncertain in its transmission to mankind, and to be also more or less enzootic. The symptoms are much like those of cow-pox, the only important differences being in the character of the exanthem, and the lesser degree of virulency of the infecting agent. The eruptions of spurious vaccinia are divided into three groups. One consists of acuminated papules or pustules, which may or may not be developed at the same time as the true pock; they appear as small red nodes about the size of a grain of millet, destitute of areola and umbilicus, and soon changing into a conical pustule, the contents of which quickly desiccate, and form a crust—the whole process only occupying from four to six days. The eruption may appear several times, however, so that the entire period will extend over a number of weeks. The second group is composed of hard indolent tumors, the so-called *steinpocken* of the German veterinarians; they vary in size from that of a pea to that of a nut, are somewhat red at first, and have no areola; or they may appear as a kind of warty excrescences on the skin of the udder. They frequently remain unaltered for weeks, or

even months, and at last disappear very slowly. Emphysematous and watery vesicles constitute the third group. They first appear on the udder in the form of red spots, which are rapidly transformed into vesicles ranging in size from a pea to a cherry, but destitute of areola and umbilicus. They contain a serous or purulent fluid, are readily broken, and are covered by very thin crusts, which soon fall off. Frequently their contents are quickly absorbed, leaving only an empty epidermic envelope, which constitutes the emphysematous pock. They pass through all their phases within five or six days.

Such is cow-pox, as we know it at the present day, and its course is exactly that of human vaccination with Jennerian vaccine, which is in reality nothing more or less than the cow-pox transmitted through very many successive generations of mankind. The vesicles of vaccinia has been simply transferred from the cow's udder or teats to the human arm—there is nothing whatever of small-pox in it.

(To be continued.)

INTERNATIONAL CONGRESS OF HYGIENE AT TURIN—VETERINARY SECTION.

President—Mr. Vallada. Vice-Presidents—M.M. Basso, (Turin); Cocconi, (Rome); Prof. Nocard, (Alfort); Dr. E. Perrin, (Paris).

(A.) Mr. Felix, of Bucharest, presented a publication on the utility of a sanitary inspection of meat.

After long discussion the following resolution was adopted:

1st—That a veterinary service of inspections of meat be established whenever there is an abattoir or slaughter house.

2d—That the inspections be made on living animals and repeated after death.

3d—That popular instruction be given to persuade the people that insufficiently cooked meat may sometimes be dangerous.

(B.) Prof. Basso asked for a regular disinfection of wagons on railroads used for the transport of cattle, so as to avoid the diffusions of contagious diseases.

The following resolution was then admitted : That the regular disinfection of wagons and trucks, whenever they have been used for the transport of solipeds, large or small ruminants, swine or poultry, is a very important measure of sanitary police, to prevent the spreading of contagious diseases of domestic animals, and it is to be hoped will be adopted by all governments.

(C.) The section discussed the etiology and prophylaxy of hydrophobia amongst animals in relation to public health.

The discussion was closed by the desire expressed by Prof. Valada, that practical studies will be made to establish the fact, that the bite of a healthy dog may give hydrophobia, though the dog is free from it, a fact not admitted by scientists, but which has been reported by some observers.

(D.) After remarks from MM. Basso and DeMarchi, the vote was taken and carried on the two following questions : Colleges are invited to study if there is not a form of curable rabies, which can transmit by bite a fatal hydrophobia, and that during the period of incubation of rabies, the dog ought always be considered as able to transmit the disease at any time, ignorant as one is when that time may come.

(E.) Prof. Brusasco speaking of the transmission of glanders to man and of the prophylactic sanitary measures concerning it, the vote was carried that ; As glanders of solipeds can be transmitted to man, by inoculation or infection, it is proposed that every government renders the destruction of glandered animals immediate, that those animals will not be submitted to treatment except in veterinary schools, and that by popular instructions people will be notified of the danger resulting from the exposure by coming in contact with such animals.

(F.) Mr. Brusasco treated of the questions of the transmission of the tuberculosis of animals to man.

Mr. Bassi did not admit as being scientifically proved that the tuberculosis of cattle is identical with that of man.

MM. Nocard and Bizzozero protested against this opinion.

The following vote was carried: Considering the probable identity of the tuberculosis of cattle with that of man, and of the possibility of the transmission of the disease by the use of meat and milk, of tuberculous cows and other animals, especially if improperly cooked, all governments are solicited to take very severe measures of sanitary police, and to instruct the public of the danger, so as to avoid the transmission of that disease from animals to man.

(G.) Mr. Gay, secretary, read for Mr. Brusaseo a note on the transmission of anthrax from animals to man, and on the measures necessary to prevent that contagion.

After a long discussion, it was voted that in case of death of carbunculous animals:

1st. That the cadavers be boiled in traveling furnaces in localities where there are no rendering yards.

2nd. The torrefaction of the soil of barns, with the disinfection of all material affected.

3rd. The covering of the soil of barns with a coat of asphalt.

4th. The establishment of stations for the burying, with previous boiling, of animals dead from anthrax or from other diseases which render them unfit for food.

(H.) A work from Prof. Basso on the different species of scabies communicable from man to animals, being read, it was proposed that popular instructions be given concerning these diseases.

EXTRACTS FROM FOREIGN JOURNALS.

CASTRATION BY ELASTIC LIGATURE.

BY M. TAYSON, V.S.

After mentioning the magnificent extracts obtained by Mr. Guerin and Rossiynol, and encouraged by the flattering reports published, the author gives an account of his experience with this new mode of operation, with the success and failure he had met

with, and compared them with the old-fashion of castration, which he had used on previous occasions, giving the following résumé of the results he had obtained :

CASTRATION WITH UNCOVERED TESTICLES.

Year.	Horses Operated.	Death	Nature of Disease.
1875.	About 30.	2	Peritonitis.

CASTRATION WITH COVERED TESTICLES, BY CLAMS.

Year.	Horses Operated.	Deaths.	Nature of Disease.
1876	About 200	3	1 Gangrene.
1877			
1878			1 Champignon.
1879			
1880			1 Indirectly.

The third death seems so indirectly connected with the operation, that it might not be counted (swelling of the penis.)

CASTRATION WITH COVERED TESTICLES (Elastic Ligature).

Year.	Horses Operated.	Death.	Nature of Disease.
1879	20	7, viz.	4 Tetanus.
1880	Besides 4 Bulls,	5 Horses	
	1 Ram.	1 Bull.	3 Gangrene.
		1 Ram.	

—*Archives Veterinaires.*

INTUSSUSCEPTION CONSECUTIVE TO A GANGRENOUS SWELLING.

BY M. LEMONNIER.

A sorrel mare, 5 years old, had died from a wound. The history is that about ten days ago she was stabbed in the back by her driver. Four or five days later a large œdema took place, accompanied with flow of serosity. Shown to a veterinarian, a resolute friction was applied without result, and the mare died a few days after, though the day of her death she had been at work, and showed signs of sickness only in the evening, when she had violent colics.

At the autopsy, the body was found very tympanitic. In the middle of the back, on the left side, existed an elliptic wound, from which exudated a foetid, grayish liquid, mixed with organic detritus. A probe introduced in the wound arrived on the ribs. The cedema was very large, and extended to the chest, flank, abdomen and inguinal region of that side. It crepitated on pressure. The skin removed, the serosity was found very abundant, the cellular tissue ecchymotic in places and filled with reddish fluid, the muscular and cellular tissue were disintegrated, pulpy, greenish in color and very offensive; they were in a full state of gangrene. In the chest the intercostal spaces were intact, the parietal pleura was red and ecchymosed, the visceral showed the same lesions, less marked. The pleural sac contained a small quantity of fluid. The heart had only a few ecchymotic spots. In opening the abdomen four or five liters of bloody serosity ran out, abdominal organs were much congested, and especially the small intestines. Those organs were yellowish, much ecchymosed and easily torn. Toward the middle of the small intestine an invagination existed, formed by three intestinal cylinders, the two most internal and the mesentery covering them much congested.

The stomach contained only a little semi-liquid alimentary mass. The small intestine contained a small quantity of liquid food, of a brown-red color, which was also found in the cæcum.

The author asks if this case could not be considered similar to others of the same nature, which have been reported as sequelæ of purpura.—*Archives Veterinaires*.

SPRAIN OF THE NECK—RAPID RECOVERY WITH COLD DOUCHES.

BY W. PALAT.

A nine year old mare was found lying on the left side, with the left hind foot caught in the right rope of the halter, the head almost touching the hoof, and resting on the left side of its base in such a manner that the left eye and ear both touch the ground.

The rope is cut, and the animal assisted in getting up. She had a vertebro-cervical sprain.

She presented a large convexity on the left side, the tumor was in the middle of the neck, hard and especially very painful. The head was enormous, infiltrated, the left eye tumified, the upper eyelid the seat of a deep wound, the left ear excoriated, the head so heavy that it is carried low down. Previous to this accident the mare was very quiet, and now she is very ugly and dangerous to approach.

The treatment consisted in bleeding, cold douches on the neck all the time, except during meals. Low diet and laxation.

Improvement the next day—the œdema of the head has somewhat diminished—the neck still largely swollen. Same treatment.

The second day still greater improvement—the convexity of the neck had diminished, the head had better appearance and was carried much higher. Same application.

Five days after the accident, the convexity of the neck has disappeared, and three days later the animal was able to resume work.—*Archives Veterinaires.*

IDENTITY OF THE ACUTE EXPERIMENTAL SEPTICÆMIA AND CHICKEN CHOLERA.

BY M. TOUSSAINT.

About 250 observations allowed Mr. Toussaint to say that chicken cholera is nothing else than acute septicæmia, contracted spontaneously; to take the disease it is necessary that these animals have access to putrified substances. In septicæmic blood, and in the septic virus, which kills rabbits in ten or twenty hours, Mr. Toussaint has found a microbe similar to the one discovered in chicken cholera. By the ingestion of blood of septicæmic substances he has reproduced the symptoms and lesions of cholera in chicken. Mr. Toussaint has found in the putrified blood of carbunculous animals, bacteridies and also the septic microbe; the

first inoculation killed rabbits by anthrax, and later when the bacteridies disappeared, the microbe resisting, the same blood killed hens with all the lesions of cholera. In some animals, on the contrary, such as dogs, sheep and guinea pigs, the bacteridies resist the most; the septic microbe is eliminated, and it is always by anthrax that those animals died when inoculated with that blood.

Mortal septicæmia shows itself even in animals which have not been inoculated, but which have taken septic virus through digestive apparatus; the inoculation has then taken place through lesions of the buccal or guttural membrane. In the point of view of general prophylaxy this is an important discovery.—*Revue d'Hygiène*.

PRIZE ESSAY.

By J. T. DUNCAN, V.S. (Toronto.)

CONTAGIOUS DISEASES OF CATTLE.

I. PLEURO-PNEUMONIA CONTAGIOSA—INTRODUCTION.

In treating of the contagious diseases of cattle, the one mentioned above demands our first attention; not only on account of the enormous injury it is capable of inflicting on the stock interests of any country to which it is brought—not only because of the prominence given to it by recent events, but because of the facility with which it may be introduced into a country at present free from it. This it is which gives to Canada such a vital interest in the disease. We are, and have been, free from its ravages. So long as we remain so, our trade in cattle (now one of the most lucrative and important to the country) will not be subjected to annoyance and loss by legislative interference. While the United States, by gross governmental carelessness, have allowed it to become firmly established in their borders, we are enjoying the ben-

efits of our own precautions in the matter. Our immunity from this plague is a source of gratification, especially to the veterinary profession, and if the Government, in concert with the profession, can preserve to the Dominion a continuance of that immunity, they will deserve the thanks of all.

But we know not how long this condition may remain. Along our southern frontier lies an infected country. True, the west as yet claims exemption, but this fact has not been established by proper veterinary inspection. The inter-state trade is practically unchecked, and the only reason why the west is not affected is the fact of the course of the cattle trade being from west to east. Nor are we in danger of infection from the United States only, but from Great Britain as well.

And other contagious diseases besides the one just mentioned demand our care and vigilance that they may not be brought into the country. To supply the information necessary to guard against such plagues, and to spread information regarding them in an available form, these pages have been written. The more important facts will be stated as concisely and as clearly as possible, while practical matters, as distinguished from theoretical speculations, will receive most attention.

HISTORY.

Although various writers have stated that this disease has existed from time immemorial, no really good account of it was written till the eighteenth century. From the hazy and extremely general description of previous authors, it is difficult to make out of what affection they are writing. Some, however, have supposed that Virgil wrote of pleuro-pneumonia so long ago as before the birth of Christ, quoting, in support of that opinion, a description found in the third book of Georgics. During the eighteenth century it prevailed more or less extensively in Europe, and in 1769 Bourgelat, a French veterinary surgeon, first wrote a good description of it. Not, however, till 1842 was it brought to Great Britain, from which country it has never since been banished. To the United States it "was imported in 1843 and 1850

by Dutch and English cows, and has since silently spread over nearly the whole eastern sea-board." *

ORIGIN.

The question of the spontaneity or otherwise of its origin has been much discussed. Some hold that, given a certain concatenation of circumstances, and it may arise abiogenetically. Others, again, equally good authority, maintain that it does not originate spontaneously. Practically, it may be assumed that any manifestations of it seen in these latitudes are due to *contagion, mediate or immediate*.

This brings us to the question (which has been much discussed) of how the disease can be communicated. Granted that it does not arise spontaneously, is there any other means of its propagation than the actual cohabitation of infected and healthy cattle? Many excellent authorities, as Professors Simonds and Brown, hold that it can be communicated in no other way. Their experiments, as well as those recently tried by Dr. Burdon-Sanderson at the Brown Institute, go far to support this view. This is known as *immediate* contagion.

On the other hand, such able men and high authorities as Fleming, Walley, Williams, and the continental surgeons generally, strongly combat this view, holding that whatever support it may appear to have from experiments, clinical facts prove conclusively that the virus can be carried on hay, straw, manure, various objects in the stable, etc. This is what is spoken of as *mediate* contagion. The supporters of this opinion point to such facts as this: that from a stable in which pleuro-pneumonic cattle were kept, all stock were removed, the stable cleansed and kept empty for months, and perfectly healthy stock, which had no possible communication with the disease in any other way, put in; *these cattle fell victims to pleuro-pneumonia*. Such facts as these are too numerous and well authenticated to be disputed, and leave no doubt of the correctness of those who hold the possibility of *mediate contagion*, unless, indeed, we account for these outbreaks on the ground of the autogenetic origin of this disease.

* Professor Law.

DEFINITION.

It is an insidious, exudative, zymotic disease, due to a specific poison or ferment, peculiar to the ox, and having its local manifestations concentrated in the lungs and pleura.*—(WALLEY.)

PATHOLOGY AND SYMPTOMS.†

There is much variety in the manifestations of the disease. In some instances, more especially during its first outbreak in a district, it runs a rapid course, destroying life in the course of a few days, the lungs after death presenting the appearance of a congestive inflammatory change. In other cases—and these are by far the most numerous—the onset, course, and termination of the disease occupy a period of from four to eight weeks, or even longer, the animal becoming much emaciated and finally succumbing to an exhausting diarrhoea, imperfect aëration of its blood, hydrothorax, or to the depressing influence of degenerated animal matters in the blood, and anæmia.

Premonitory Symptoms.—Similar to the cattle plague, the commencement of the disease is often not observable. Thus attention is only called in many instances to an animal for the first time appearing unwell, but in which an examination brings to light the fact that changes of structure have taken place to such an extent as to convince the observer that disease has been gradually increasing for a lengthened period. The thermometer is the only true guide by which we are able to discover the end of the incubative, and the beginning of the active stage. For example, the introduction of the disease into Australia from this country proves that the first manifestation of illness is not at all to be depended upon as a guide to its true commencement; for the carriers of contagion—bulls for breeding purposes—were three months on the voyage; the disease only breaking out after they were landed.

It is of great importance that thermometric observation should be made during the prevalence of pleuro-pneumonia, in order

*Professor Yeo questions its zymotic character.

† From Principles and Practice of Veterinary Medicine.

that owners of stock might be warned in time, and that measures be taken to isolate or otherwise dispose of all animals in which the temperature is found to be rising. In a suspected herd, all animals showing a temperature above 102° should be carefully watched. If the heat rises above this, there can be little doubt that the disease is at work. Usually the temperature rises to 103° or as high as 106° ; but I have no case on record where the latter point has been exceeded.

The palpable or obvious symptoms are slight rigors or shiverings, the hair merely standing the wrong way; loss of appetite to some extent; secretion of milk diminished; in some cases the animal "knuckles over" at one hind fetlock, usually the right one; an occasional cough is heard, which is dry and hard in character, and not the painful cough of pleurisy, as one would suppose; rumination becomes irregular, and although there is some loss of appetite, the animal seems fuller than his fellows which are healthy and eating vigorously. The bowels are rather constipated, and the urine is scanty and high colored.

The pulse of cattle, as I have already stated, is not, more especially with regard to its number, a good guide to the practitioner in this or any other disease; however, as it advances, the pulse becomes accelerated and of a feeble character—sometimes a large soft pulse, sometimes a small wiry one. These insidious symptoms may continue for several days, the most careful examination of the chest denoting nothing unusual except a tenderness on pressure applied to the intercostal spaces of one or both sides, and pressure upon the back causing the animal to wince and perhaps to give a slight groan. Some cases in an infected herd will at this stage begin to give obvious signs of recovery, and in a few days be as well as ever again, the morbid material having evidently been expelled from the body without causing any important pulmonary change. In all cases, however, some amount of irritation of the lung tissue has been induced, as a cough remains for some time longer. Should recovery not take place, the signs of general disturbance gradually, sometimes rapidly, increase, the cough becomes more persistent, the mucous membranes, except that of the nose, are generally pale, the respiratory movements increased in

frequency, more abdominal and shallow. When the animal stands, the elbows are turned out, the nose extended, the back arched, and the hind limbs drawn under the body and knuckling over at the fetlocks. When recumbent the animal throws the weight of the body upon the sternum, and, owing to the anatomical conformation of this bone and its articulation with the true ribs, the chest is thus expanded.

The breathing becomes painful, and is often accompanied by a moan or grunt, emitted during each expiration; the nostrils are dilated, a discharge issues from the eyes and nose, which is at first colorless, but often becomes purulent and yellowish. The extremities, as well as the horns and ears, vary much in temperature. Sometimes all are cold; often, however, one ear and one horn may be cold whilst the others are hot, and so on with the extremities. Constipation of the bowels continue in many instances for long periods, in others it is succeeded at an early stage by diarrhoea, which, if not too persistent, seems to have a salutary effect. The surface of the body becomes harsh and dry; the skin appearing to be tightly bound to the sub-cutaneous structure; there is rapid loss of flesh; and if diarrhoea assumes a colliquative character, the animal dies in from three to six weeks from the first visible manifestation of the symptoms.

The symptoms upon percussion are tenderness and some amount of dullness; the dullness increasing in proportion to the exudation and consolidation. If, at the outset of the disease, it can be determined that both lungs are inflamed, the prognosis in all cases is unfavorable; but if, on the contrary, it can be demonstrated that but one lung is affected (the right lung according to my experience being more prone to suffer, but showing a greater tendency to recovery,) there are some hopes that the case may recover; for very frequently the morbid action is confined to the side primarily attacked.

Auscultation will detect a friction sound, caused in the first stage by the surfaces of dry pleura moving upon each other, and, in the more advanced stage, from being roughened by deposits of fibrin. These friction sounds are accompanied by others which indicate that the disease is not confined to the pleural surface only;

thus we have crepitation, both large and small, indicative of inflammation of the lung-connective tissue, with ronchus and sibilus denoting bronchial disease. It is seldom, indeed, but that some sound or other is detectable in all parts, except the lower portions of the chest; the consolidation of the lung, extensive though it may be, being insufficient to mask or hide the abnormal sounds emitted by the lung tissue, pleura or bronchial tubes.

When the disease is confined to one lung, the respiratory murmur in the healthy lung is louder than natural, owing to its having to admit more air than when both are in a state of health. This must not be confounded with a diseased condition, and in order not to make a mistake percussion must be applied. The healthy side will be resonant, the diseased one dull. I have seen some cases where the diseased and consolidated lung enlarged to such an extent as to push the ribs immediately covering it outwards to some extent, the animal appearing rounded and larger on that side in consequence, and some of these cases have afterwards thriven and become fit for the butcher.

Now and then it is found that some portion of the lung becomes gangrenous and is coughed up; these cases are, however, very rare. When gangrene occurs, the discharge from the nose becomes sanious and foetid, and a foetid diarrhoea soon carries off the suffering beast. Abscesses in the lung are an occasional consequence. An animal apparently recovers from the disease, but after a time begins to lose flesh and sinks from exhaustion, the post-mortem revealing a large abscess or abscesses in the lung tissue. Another termination is the formation of groups of tumors upon the pleural surfaces, more especially that portion of them covering the anterior aspect of the diaphragm, upon the pericardium and peritoneum. These tumors are known amongst butchers and others as "grapes," and are supposed to be due to the tubercular diathesis. There is no doubt that sometimes these deposits are essentially scrofulous, and are caused by that condition of the body independently of pleuro-pneumonia; in other cases it is beyond a question that they are merely the altered exudatis of pleuro-pneumonia—altered inasmuch as they have undergone the caseous, fatty or calcareous degeneration. In some

instances of very extensive consolidation, the sounds detectable by auscultation and those emitted by percussion are very trivial. In such it is found that the alteration of structures is most extensive in the central portion of the lungs. One symptom is very diagnostic of this condition, namely: much coughing when the animal attempts to swallow; this is caused by the exudate pressing upon the œsophagus within the chest and retarding the act of deglutition.

THERMOMETRY.—The importance of this has already been touched upon. The use of the thermometer is held to be so valuable a guide in discovering the presence of contagious diseases, that the British Privy Council insists on its use in all suspected cases, and directs that so long as the temperature of an animal is elevated, such animal must be retained in quarantine. It is of the last importance, then, that, especially in connection with this disease, the subject be understood as thoroughly as possible.

“The domestic animals present a tolerably constant temperature in health, *i. e.*, this warmth is not dependent on the atmosphere in which they are. Thus, in man it is 35.5° Centigrade (99.5° Fahrenheit); in the horse, about 38.25° C. (100.85° F.), and in cattle, 38.2° C. (100.76° F.), these numbers being the average from numerous observations.

“In disease, we find more or less alteration, and Claude Bernard has proved that a disease may be fundamentally diagnosed by the mere deviations of the temperature from the normal standard.”

It has been known since the days of Hippocrates that increase of temperature was a reliable sign of disease, but it is only since the invention of the thermometer that this can be measured exactly.

“*Clinical Thermometry* is that which furnishes us with the variations of the animal temperature during disease * * * It proves of immense advantage to the practical veterinarian, under some circumstances pointing out the approach of disease * * * and provides valuable hints in the treatment.

“This instrument (thermometer) is necessary where exact-

ness is required, and it answers the same purpose in investigating the temperature as the second hand does in counting the pulse."

In using the thermometer "it is placed six or eight inches in the rectum, and in complete contact with its walls: it should be left in this situation about ten minutes, after which it should be read by partially withdrawing it; replaced again for another two minutes, and again read."*

In this way correctness is insured, and to save the time of the operator it is suggested that the thermometer be brought to near the normal temperature of the body before inserting it. The rectum should be cleared of excrement before the instrument is inserted. Zundel gives a very excellent table, whereby the temperature may be recorded conveniently, which all inspectors should use, as it enables a complete record of large herds to be kept with ease, the results being apparent at a glance.

To show the reliance placed upon the thermometer by the British authorities, the following *résumé* of the Report is presented:

"Notwithstanding Article 3 of the Circular of 1873, prescribing the obligatory slaughter of pneumonic animals, the Privy Council, attributing in great part the continuation of the prevailing pleuro-pneumonia to the delay of slaughtering * * * are of opinion that the disease would be efficaciously stopped by other disposition if executed in the following manner:—

"1st. Cattle affected with pleuro-pneumonia must be killed in the shortest possible time.

"2nd. The *internal temperature* of each animal which has been exposed to contagion must be observed, and the herd divided into two separated lots.

"The lot A will include animals whose temperature will rise above 103° F. These will be destroyed in the shortest possible time, if positive symptoms of pleuro-pneumonia became manifest.

"The lot B will include the balance of the herd. Those animals will be examined *with the thermometer every week, and transferred to lot A if the temperature rises above 103° F.*"

*Aug. Zundel.

As the result of a great number of experiments, a distinguished continental authority, Ed. Dele, comes to the following conclusions :* "The *invasion* of pleuro-pneumonia (not easy to recognize) is accompanied by an increase of temperature. This continues during the period of *increase*, and it is at its height at the period of *acme*. From that it declines and indicates the period of *decline* towards recovery (slow diminution) or towards death (probably more rapid)."

TREATMENT.—Seldom indeed will the enlightened practitioner attempt medicinal or curative treatment. One reason for this is the danger of keeping infected stock, for generally a case of apparent recovery is not a sound animal.

Dr. Thayer gives the following as a case of supposed recovery: "One-half or two-thirds of the lungs are solidified; the first effort of nature is to throw around the diseased mass a covering of fibrinous material, entirely shutting off the healthy from the diseased tissue, which is generally accomplished in from fifteen to forty days. Suppuration then commences on the surface of the diseased mass, which continues until the whole is liquified; absorption is constantly going on, and in from six to twenty months the animal recovers, but with the loss of a portion of the *vital organ*. If the animal is a working bullock, its value is destroyed; if a cow in milk, after the acute stage is passed, the secretion is partly restored, and the milk consumed by the people."†

If treatment is undertaken in any case, no attempt must be made to "cut short" the course of the disease. Unfavorable symptoms may be controlled by medicine, and every attention given to hygienic measures. The sick must be carefully segregated, have plenty of fresh air "but without producing draughts: the skin should be protected by a light rug, which must be sufficiently thin to allow of cutaneous transpiration; feeding not to be thought of in the earlier stages;" later, semi-fluid matter, as milk, glycerine, and raw eggs may be given in the acute stages, cod liver oil and molasses in the convalescent. Brushing the skin

*Ed. Dele in AM. VETERINARY REVIEW.

† Massachusetts Report.

is useful. "Medicinally, laxatives—hydrogogue salines in preference—should always be administered in the outset * * * Skin and diuretic medicines—as cream of tartar, acetate of ammonia, camphor and nitric ether, with carbonate of ammonia—should be given in the early stages; stimulants later. In the convalescent stages, iron compounds, arsenic, and hyposulphite of soda with nux vomica or strychnia alternated with dilute sulphuric acid."*

Bleeding is not to be recommended, nor are counter-irritants successful.

PATHOLOGICAL ANATOMY.

In order to understand more clearly the post-mortem appearances seen in *pleuro-pneumonia contagiosa*, we may briefly indicate the normal anatomy of the bovine lung. The chief peculiarity, and one which involves the other peculiarities, is the distinctness with which the lobules are marked off and separated from each other. This division is accomplished "by thick layers of cellular (areolar) tissue, continuous with the internal face of the visceral pleura (those septa are rather the interlobular ramifications sent off from the *subserous envelope*.) Dietrichs, who first drew attention to this peculiarity in the larger ruminants, has justly remarked that it perfectly explains the altogether special characters of lesions of pneumonia in these animals."†

The special points in the normal anatomy have been thus summed up:

1st. The vascular and bronchial territories are distinctly defined and independent of one another.

2nd. The lobules of the lung in the ox are quite distinct, and may be separated without injuring their air-cells, (they may be drawn $\frac{1}{8}$ of an inch apart without injury to the connective tissue connecting them.)

3rd. Each lobule is enveloped in a case of connective tissue, which contains a rich plexus of lymphatics.

4th. A sheath of delicate connective tissue also surrounds the

*Professor Walley.

†Chauveau. See also Strangeway's Anatomy.

broncho-vascular system, and forms the bed of large lymph channels.

5th. The lymph from the interlobular spaces passes along the peri-bronchial passages.

6th. As the lymph vessels follow the course of the broncho-vascular systems, those around any given system must drain the territory of the lung tissue supplied by that system.

7th. The subpleural lymphatics seem to take a less important share in draining the tissue than is the case in many other animals.

In order that we may more clearly understand the changes, we notice, first, the *Pleural*; second, the *Lung*, and third, the *Broncho-Vascular* lesions.

Changes in the Pleura.—These show pleurisy of an acute type, differing, however, in not being diffused, as in ordinary pleurisy, but localized. Wherever the lung below is the seat of disease, the pleura above is covered with a dense fibrinous exudation. As the disease advances in the substance of the lungs, the contiguous lobes become firmly cemented by the adhesion of their pleural surfaces. The visceral and parietal surfaces are generally separated by a quantity of fluid effusion, which is thin, yellowish or greenish in color, coagulating after removal, showing the presence of some fibrin. If the anterior lobes are affected, the pericardium generally becomes inflamed and thickened as well as the pleura. To sum up:

1st. It has the character common to the ordinary forms of acute pleurisy.

2nd. It always varies in degree of severity in different parts of the same pleura.

3rd. Its point of greatest intensity corresponds to the apparent starting point of the lung lesion.

4th. It is not an invariable or essential part of the disease, for the lung may show disease and the pleura not.

5th. It usually appears to be of more acute type and more recent development than the lung lesion.

6th. Its occurrence often gives the first indication of the existence of disease.

Changes in the Lungs.—The situation of the disease of the lung is generally shown by the lesions, already mentioned, of the pleura. But if this is absent, the pleura not being affected, the portion of diseased lung tissue can still be easily recognized as a hard, heavy, airless, discolored mass, standing out boldly from the neighboring normally collapsed lung tissue, which is light, soft and elastic.

The extent to which the organs may be affected varies greatly; it may be a nodule the size of a man's fist, or, in a long standing case, the whole of one lung (more often the right), or the greater part of both, may seem to be involved. By inflation, the small remaining healthy portion may be brought into view. Even in an inflated lung, however, the diseased stand out above the healthy portions, being considerably increased in size, from the hyperplasia in the interlobular spaces.

If, now, a section be made through the affected part, cutting from the surface toward the root of the lung, we find the diseased part *wedge-shape*, the point towards the root, the broad part to the pleural surface. This is not so well seen in the advanced cases, but is exceedingly characteristic in the earlier stages. The line of demarcation in these cases always corresponds to the interlobular spaces. These sharp lines of demarcation, not only between the healthy and diseased structure, but also between the several territories affected with the various degrees of morbid change (which are so different in color), are among the most obvious characters of the anatomical appearances.

Perhaps the most striking appearance seen on the cut surface is the net-work of pale yellow lines which is distributed over it. The lines forming this network are, on an average, about $\frac{1}{8}$ of an inch in diameter. They cross each other so as to map out the surface into a number of polygonal areas, about one-half or three-quarters of an inch in diameter. These areas are found to correspond to the lobules, and the lines are formed by the exudate into the interlobular connective tissue. These pale lines resemble, in a cut lung, the veins in marble, hence that name has been given. This marbling is considered (by some) to be the great diagnostic character of this disease.*

* It is but proper to state that, although Professor Yeo and others hold the opinion stated above, Professor Williams and others dissent entirely from it.

Three very distinct conditions of the lung tissues are to be noted: 1st, *clear exudation*; 2d, *opaque consolidation*; and 3d, *black consolidation*.

The two latter forms, viz.: the opaque and black consolidation, are seen in various stages in the diseased lung, generally, however, if they co-exist, being sharply divided from each other by the pale markings spoken of previously.

The portion of tissue showing the black consolidation are denser, heavier than the opaque, and show a further advanced and more intensely diseased condition. Around both the opaque and black portions, however, may be seen the first conditions spoken of, viz.: the clear exudation.

This may be spoken of as simply exudate, and infiltrates the tissues with a clear material, found, as previously stated, in the periphery of the diseased portions, forming a very complete case around them. The three conditions spoken of now may seem to shade off into each other, but they are really distinct. The clear and opaque forms, also, may be seen without the black, but the latter is never found alone, being always associated with and preceded by the other lesions, which seem to be of much longer duration.

The more important of the foregoing facts, as to the lung change, are:

1st. The lung parenchyma is usually the seat of various forms of irregularly arranged exudation, which gives it a mottled look.

2d. The interlobular spaces are always the seat of more or less exudation, which gives the sections the appearance of pale yellowish lines.

3d. These pale lines sub-divide the mottled surface into irregular small fields—*marbling*.

4th. Three kinds of lung lesion—(a) Clear exudation; (b) Opaque; (c) Black consolidation.

5th. (a) or (b) may become dense, and form tissues of cicatricial hardness.

6th. (c) may produce gangrene, caseous degeneration or fibrinous crumbling.

There remains now to speak only of the changes in the bron-

cho-vascular systems. These systems will be spoken of together, as they are so intimately connected, the bronchus lying between the artery and vein, all being surrounded by a sheath of connective tissue, in which ramify the lymphatic vessels.

On cutting across a portion of diseased lung, we find the bronchus occupied with a dense mass of granular material, which completely occludes the smaller bronchi and tapers off into the larger ones. If this is removed, we find the mucous membrane rough, discolored (dull grey or yellow), and stripped of its epithelial lining.

The walls of those air tubes which contain the firm plugs are always enormously thick and dense. And, besides this thickening of the walls of the bronchi, their delicate connective tissue sheath is the seat of dense exudation; as a consequence, becoming a tough and rigid case. This exudation appears to be, in character, similar to that which fills the interlobular spaces.

As the blood-vessels ramify with the bronchi—surrounded by the same connective tissue sheath—it is not surprising that we cannot have morbid changes in the bronchial without speedily finding them in the vascular system.

As a matter of fact, the walls of the blood-vessels soon become engorged, the external coat being first attacked, the others, in turn, becoming thickened and rigid. Red spots are seen here and there on the inner coat. It may be destroyed entirely for a considerable portion, and then a clot gradually forms which may completely fill the vessel. At once the stoppage is complete, the clot seems rapidly to grow into the larger branches, at last producing complete occlusion of the larger trunks.

The foregoing account of the Pathological Anatomy is much condensed from Professor Gerald Yeo's report on the subject.

The question of where the disease commences is one which has been considerably discussed, but which is not at present of any great practical importance. Prof. Yeo holds that it always commences in the "air passages as a chronic inflammation associated with destruction of the bronchial mucous membrane," while the contrary opinion is that it may originate anywhere, either as above or in the lung tissue or the pleura.

Professor Yeo's opinion is strongly supported by the generally admitted fact that the bronchial and peri-bronchial lesions are of older standing than those of the parenchyma, while the pleuritic are the most recent of all. He says:

"I can well understand how a beast, by sniffing the fodder of a diseased neighbor, may draw into its air passages some of the dried discharge, and thus infect the bronchial mucus membrane and get pleuro-pneumonia, while all the skill of science will not induce the disease of the lung" by inoculation with the same material.

Of more importance is the question whether pleuro-pneumonic meat is fit for human food or not. The Dublin Sanitary Association appointed a committee to examine the question, and after a full enquiry they reported decidedly against its use. On the other hand, another committee, appointed by a different society, but composed of equally distinguished medical men, and after as careful an examination, say: "It follows * * * that the *fresh* and *unchanged* meat of animals slaughtered during an attack of pleuro-pneumonia may be safely consumed, and that such meat is not sensibly less in nutritive value than that of other animals unaffected by any disease, but that it is of inferior quality."

There can be little doubt that this is the case; in the early stages it is perfectly fit for human food.

Dr. Blake White has carefully examined the milk of cows suffering from pleuro-pneumonia, and he reports it as decidedly unfit for human food. He says: "I have no hesitancy in pronouncing these samples of milk not only unwholesome, but in consequence of the very low percentage of fat, innutritious, and showing in every way what a depreciating effect unwholesome and insufficient food has upon this important secretion."*

*Report of Sanitary Inspector.

(To be continued.)

SOCIETY MEETINGS.

MONTREAL VETERINARY MEDICAL ASSOCIATION.

This Association held its opening meeting for the winter session of 1880-81 in the lecture-room of the Veterinary College, Union Avenue, on Thursday evening last—the President, Dr. Osler, in the chair. The President opened with an address to the members, before retiring from office. The meeting then proceeded to the election of officers for the ensuing session, with the following result:—President, C. J. Alloway, V.S.; 1st Vice President, James Bell, M.D., 2nd Vice President, M. C. Baker, V. S.; Secretary and Treasurer, E. J. Carter; Librarian, B. D. Pierce.

Mr. Alloway then took the chair, and addressed the meeting; followed by Professor McEachran, Honorary President, who expressed his satisfaction upon the prosperous condition of the Association and the library connected with it, which is now one of the most valuable on this continent, containing all the oldest and the most recent works on veterinary and collateral sciences. He also pointed out the benefits to be derived by the members of the Association from their meeting together for the purpose of hearing papers read and discussed.

The following gentlemen were proposed as members of the Association:—A. W. Clement, Geo. W. Goetz, T. J. O'Connell, Alfred W. Mears, James Brodie, J. A. Duncan, P. Paquin, F. Paquin, P. A. Pomroy, L. W. Bergeron, C. B. Robinson, Pierre Gadbois, V. T. Daubigny, V.S., R. T. Whittlesey and William Lemay.

A vote of thanks was passed to the retiring officers.

At the next meeting, on the 28th instant, Prof. McEachran will read a paper on the important subject of "Tuberculosis of cattle and its relation to public health." A communication will also be read on "Purpura Hæmorrhagica," by Mr. Chas. H. Ormond.

OBITUARY.

It is with regret that we have to report the death of Doctor E. R. Wing, of Needham, Mass., which took place from tetanus on the 17th of October. He graduated last March and delivered the first valedictory address at the commencement of the American Veterinary College. The news of his death will be mournfully received by his colleagues and friends, as well as by his alma mater.

EXCHANGES, ETC., RECEIVED

Clinica Veterinaria, *Recueil de Medecin Veterinaire*, *Journal de Zootechnie*, *Archives Veterinaires*, *Revue fur Thierheilkunde und Thierzucht*, *Oesterreichilche Monatschrift fur Thierheilkunde*, *Veterinary Journal*, *Veterinarian*, *Revue d'Hygiene*, *Archiv fur Wissenschaftliche und Practische Thierheilkunde*, *Gazette Medicale*.

Medical Record, *Turf, Field and Farm*, *National Live Stock Journal*, *Prairie Farmer*, *Ohio Farmer*, *Practical Farmer*, *Country Gentleman*.

NEWSPAPERS.—*Providence Morning Star*, *Gazette (Montreal)*, *Providence Daily Journal*.

PAMPHLETS.—*La R. Scuola superiore di Medecina Veterinaria di Milano*.

BOOKS.—*Report of the Board of Health of the City of Nashville*.